

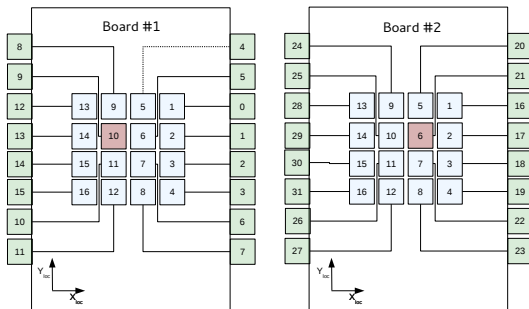
PET32 prototype: initial data study

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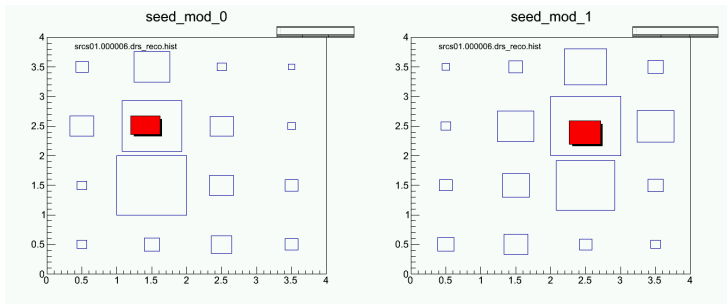
April 9, 2012

Introduction

- DRS4 amplitude calibration OK
- pedestals subtracted
- cable mapping fixed
- trigger: coincidence of channels 9 and 21

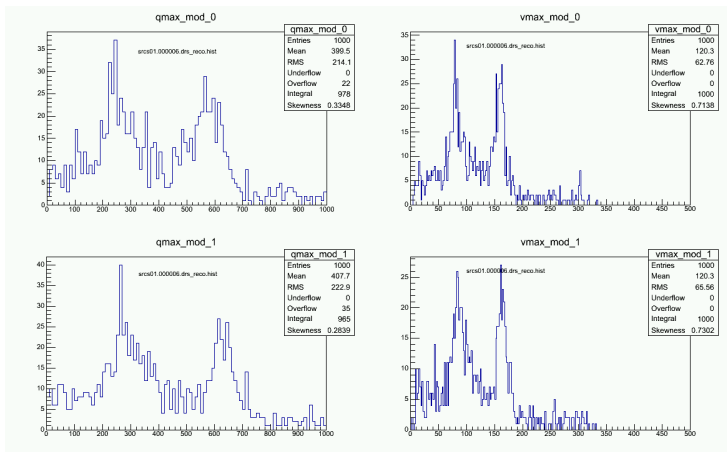


Seed channel position for 1000 events



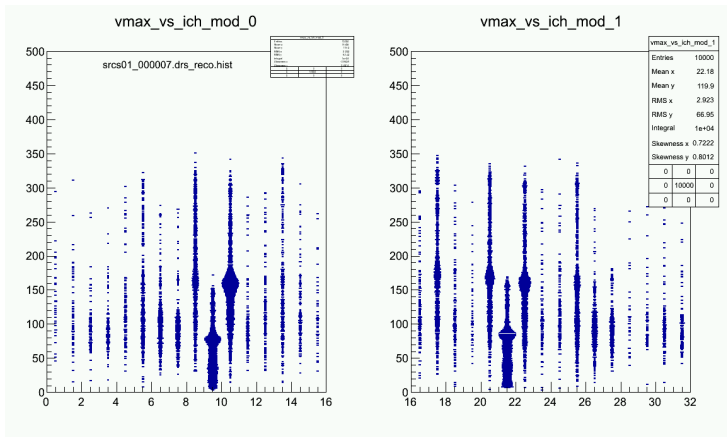
- trigger channels marked with red rectangles
- seed channel occupancy looks very reasonable
- a bit of concern: channel 9 has less entries than channel 10.
- could be due to by misalignment

Pulse heights



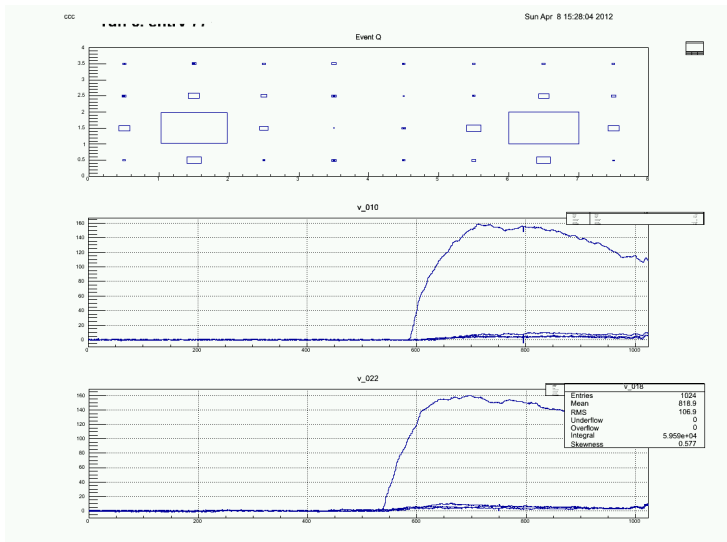
- 2 peak structure - what is it?

Pulse height vs channel number



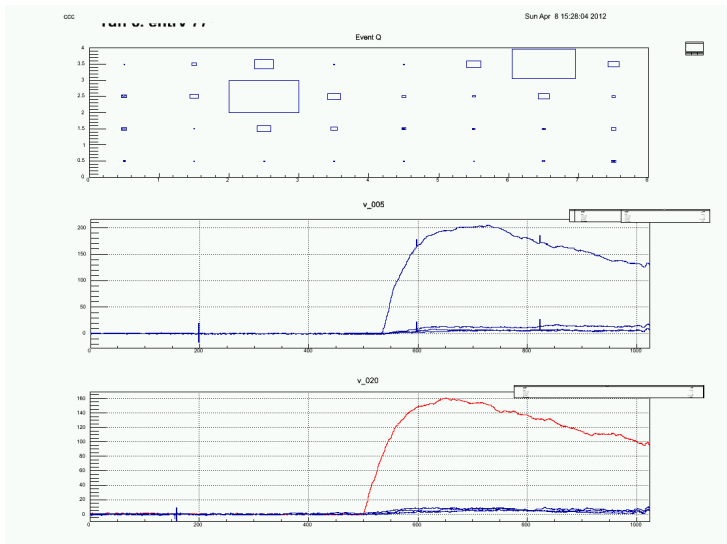
- trigger channels have 2 times lower peak value - the signal is divided!

Run 6 event 83 : Good Event



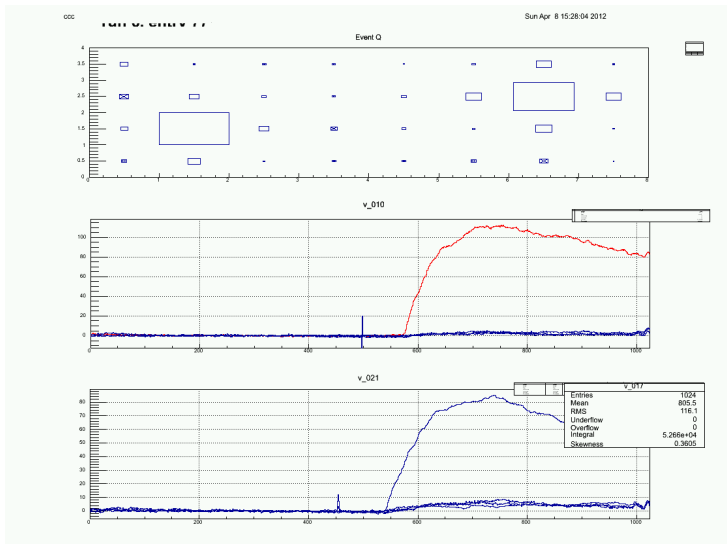
● example of a good event

Run 6 event 102: good event



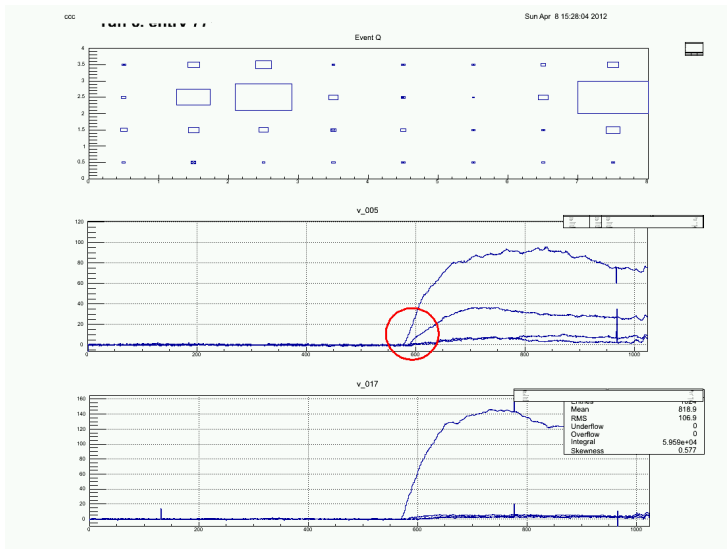
● another example of a simple event

Run 6 event 103: one more good event



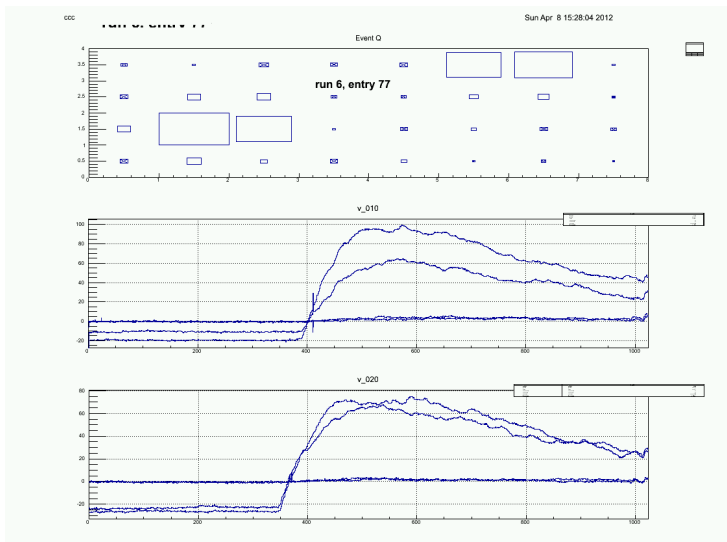
- cross-talk at the level below 10-15%, does it depend on overvoltage?
- a stripline-based readout would merge all neighbouring pulses into one

Run 6 event 87: different T0's?



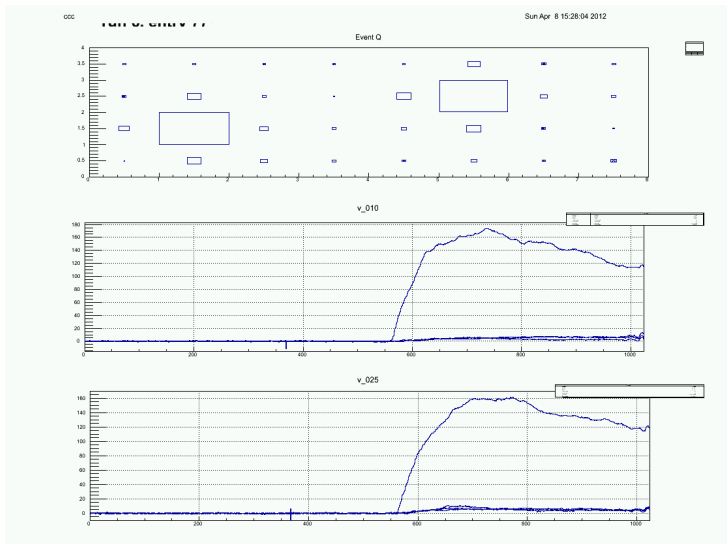
- thinking of adding charges in the 2 neighbouring crystals
- different T0's ? - need T0 calibration

Run 6 event 77: different pedestals

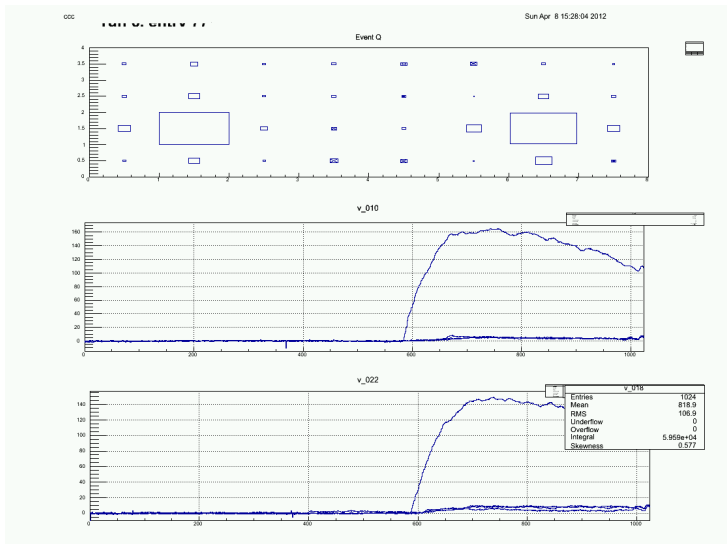


- adding charges looks sensible
- what is the meaning of different pedestals?

Run 6 event 91

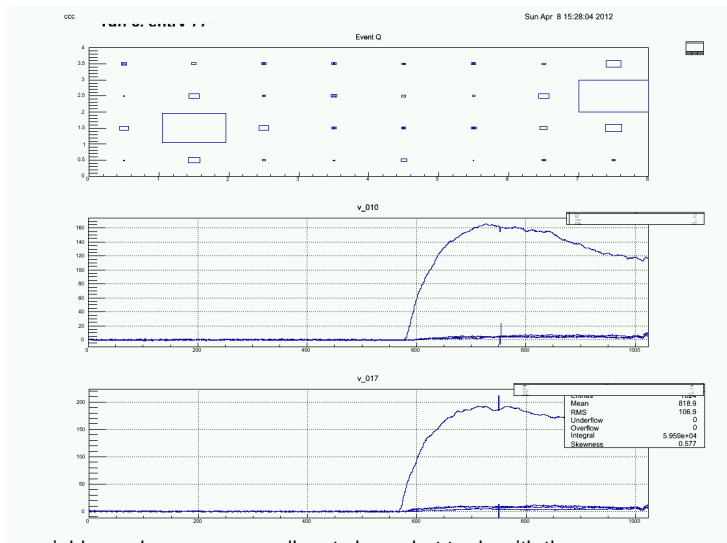


Run 6 event 92



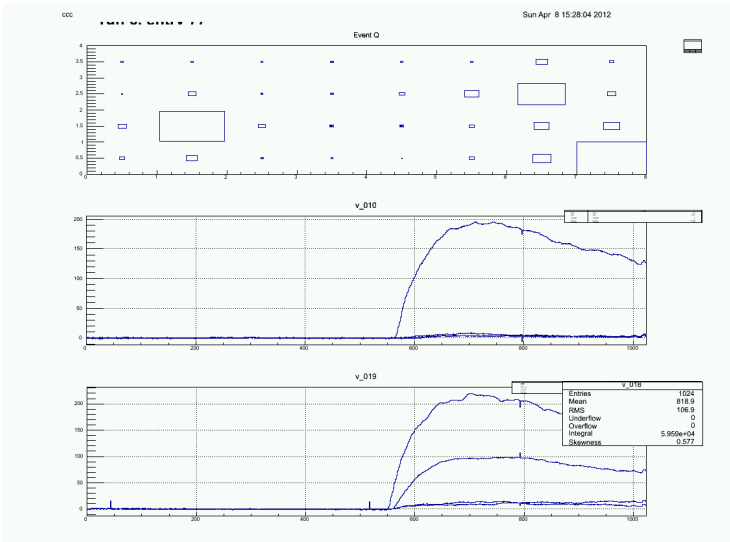
...

Run 6 event 79: yet another simple event



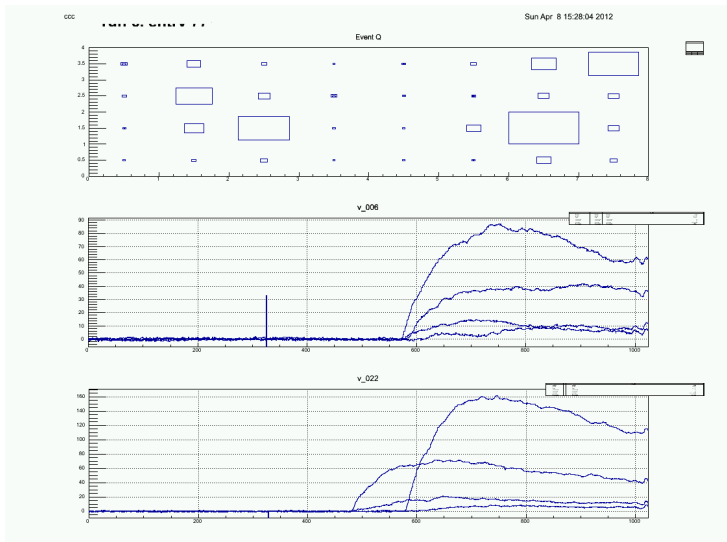
- when neighbour charges are small, not clear what to do with them
- given they all are of the same order, cross-talk comes to mind
- GEANT4-base simulation would be extremely helpful

Run 6 event 80:



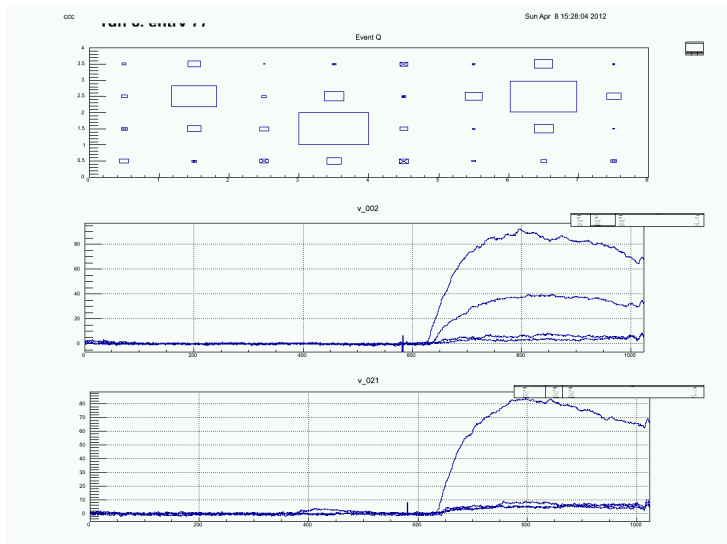
- 2nd (right) array: 2 crystals with large pulses far from each other.
- pulses seem to have the same time

Run 6 event 82: overlapping events?



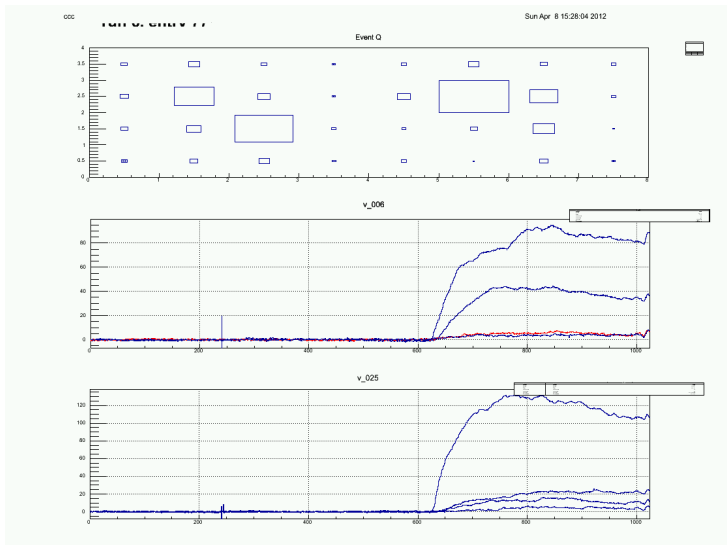
● left array: different T0's ? right : different decays ?

Run 6 event 97: cross-talk?



- array #1: seemingly unconnected clusters, correlated timing

Run 6 event 104: need T0 calibration



- need T0 calibration
- can try 3x3 clusters, first - for charge only

Summary

- channel-to-channel cross talks seem to be at 10-15% level
- GEANT4 MC would be very useful
- what are the zero voltage shifts, common for groups of channels?
- T0 calibration
- try 3x3 clusters, first - for charge only
- a real trigger based on OR of 16 channels from each side
- reduce the trigger delay - can this be done with V1742?